

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method facilitating design and manufacturing processes, the method comprising
 - receiving a plurality of article characteristic values associated with a set of articles having a range of variation as to a plurality of article characteristics resulting from a process;
 - selecting a predictor characteristic from the plurality of article characteristics; and,
 - determining the regression model(s) between the predictor characteristic and at least one of the remaining article characteristics in the plurality of article characteristics.
2. (original) The method of claim 1 further comprising
 - receiving a target value for the predictor characteristic and a target value for at least one remaining article characteristic;
 - determining the intersection of the target value for the predictor characteristic and the target value of a first remaining article characteristic relative to the regression model between the predictor characteristic and the first remaining article characteristic.
3. (original) The method of claim 1 further comprising
 - determining the respective upper and lower prediction intervals associated with the regression model(s) between the predictor characteristic and at least one of the remaining article characteristics.
4. (original) The method of claim 2 further comprising
 - determining the respective upper and lower prediction intervals associated with the regression model(s) between the predictor characteristic and at least one of the remaining article characteristics.

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

5. (original) The method of claim 4 further comprising

receiving lower and upper specification limits for the predictor characteristic and at least one of the remaining article characteristics;

locating the lower and upper specification limits associated with said at least one remaining article characteristic;

locating the upper and lower specification limits associated with the predictor characteristic.

6. (original) The method of claim 1 further comprising

receiving lower and upper specification limits for at least one of the remaining article characteristics;

locating the lower and upper specification limits associated with at least one remaining article characteristic relative to the regression model between the predictor characteristic and said at least one remaining article characteristic.

7. (original) The method of claim 6 further comprising

determining the value of the predictor characteristic at which the corresponding regression model intersects the upper specification limit for at least one remaining article characteristic.

8. (original) The method of claim 6 or 7 further comprising

determining the value of the predictor characteristic at which the corresponding regression model intersects the lower specification limit for at least one remaining article characteristic.

9. (original) The method of claim 3 further comprising

receiving lower and upper specification limits for at least one of the remaining article characteristics;

locating the specification limits associated with said at least one remaining article characteristic relative to the regression model between the predictor characteristic and said at least one remaining article characteristic.

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

10. (original) The method of claim 9 further comprising
determining the value of the predictor characteristic at which the upper prediction interval associated with the regression model between the predictor characteristic and said at least one remaining article characteristic intersects the upper specification limit for said at least one remaining article characteristic.

11. (original) The method of claim 9 or 10 further comprising
determining the value of the predictor characteristic at which the lower prediction interval associated with the regression model between the predictor characteristic and said at least one remaining article characteristic intersects the lower specification limit for said at least one remaining article characteristic.

12. (original) The method of claim 6 further comprising
receiving the lower and upper specification limits for the predictor characteristic; and
locating the upper and lower specification limits associated with the predictor characteristic.

13. (original) The method of claim 8 further comprising
receiving the lower and upper specification limits for the predictor characteristic; and
locating the upper and lower specification limits associated with the predictor characteristic.

14. (original) The method of claim 3 further comprising
receiving lower and upper specification limits for said at least one of the remaining article characteristics;
locating the lower and upper specification limits associated with said at least one of the remaining article characteristics;
receiving lower and upper specification limits for the predictor characteristic;

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

locating the upper specification limit associated with the predictor characteristic; and
determining a maximum article characteristic value for the predictor characteristic by
selecting the lesser of (1) the upper specification limit for the predictor characteristic and (2) the
value of the predictor characteristic at which the upper prediction interval intersects the upper
specification limit for said at least one remaining article characteristic.

15. (original) The method of claim 14 further comprising
repeating the determining a maximum article characteristic value step for a desired number
of remaining article characteristics in the plurality of article characteristics; and
determining the most constraining maximum article characteristic value for the predictor
characteristic by selecting the lowest maximum article characteristic value.

16. (original) The method of claim 14 further comprising
receiving lower and upper specification limits for at least one of the remaining article
characteristics;
locating the lower specification limit associated with the predictor characteristic; and
determining a minimum article characteristic value for the predictor characteristic by
selecting the greater of (1) the lower specification limit for the predictor characteristic and (2) the
value of the predictor characteristic at which the lower prediction interval intersects the lower
specification limit for said at least one remaining article characteristic.

17. (original) The method of claim 16 further comprising
determining an allowable range for the predictor characteristic subtracting the minimum
article characteristic value from the maximum characteristic value.

18. (original) The method of claim 16 further comprising
repeating the determining a minimum article characteristic value step for a desired number
remaining article characteristics in the plurality of article characteristics; and
determining the most constraining minimum article characteristic value for the predictor

Appl. No.: 10/067,704
Amdt. Dated January 19, 2004
Response to Office Action of November 18, 2004

characteristic by selecting the greatest minimum article characteristic value.

19. (original) The method of claim 18 further comprising
determining the maximum allowable range for the predictor characteristic by subtracting
the most constraining minimum article characteristic value from the most constraining maximum
characteristic value.

20. (original) The method of claim 19 further comprising
determining the target manufacturing value for the predictor characteristic by selecting a
value between the most constraining minimum and maximum article characteristic values for the
predictor characteristic.

21. (original) The method of claim 19 further comprising
determining the target manufacturing value for the predictor characteristic by selecting the
midpoint value between the most constraining minimum and maximum values for the predictor
characteristic.

22. (original) The method of claim 21 further comprising
receiving a target value for the predictor characteristic and a target value for at least one
remaining article characteristic;
determining the intersection of the target value for the predictor characteristic and the
target value of a first remaining article characteristic relative to the regression model between the
predictor characteristic and the first remaining article characteristic.

23. (original) The method of claim 1 wherein the selecting step comprises
selecting the predictor characteristic based at least in part on an assessment of the
capability of each article characteristic to be predictive of all or a subset of the article
characteristics in the plurality of article characteristics.

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

24. (original) The method of claim 23 wherein the selecting step comprises
calculating the correlation coefficients between all or a subset of the article characteristics;
determining, based on the calculated correlation coefficients, a value indicating the
predictive capability of a first article characteristic relative to all other article characteristics;
repeating the determining step for said all or a subset of the article characteristics; and
selecting a predictor characteristic based at least in part on the values indicating the
predictive capabilities of the article characteristics.
25. (original) The method of claim 24 wherein the predictor characteristic is selected as the article
characteristic associated with the value indicating the highest predictive capability.
26. (original) The method of claim 24 further comprising
ranking the article characteristics based on the values computed in the determining step.
27. (original) The method of claim 24 wherein the determining step comprises
calculating the average correlation coefficient for each article characteristic.
28. (original) The method of claim 24 wherein the determining step comprises
calculating the average of the absolute values of the correlation coefficients for each article
characteristic.
29. (original) The method of claim 23 wherein the predictor characteristic is selected based on a
graphical determination of the article characteristic having the greatest predictive capabilities.
30. (original) The method of claim 23 wherein selection of the predictor characteristic is further
based on factors associated with assessing each article characteristic.
31. (original) The method of claim 30 wherein the factors comprise the economic factors associated
with assessing each article characteristic.

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

32. (original) The method of claim 30 wherein the factors comprise the technical factors associated with assessing each article characteristic.

33. (original) The method of claim 28 further comprising
ranking the article characteristics based on the values computed in the determining step;
and
wherein selection of the predictor characteristic is further based on economic or technical factors associated with assessing each article characteristic.

34. (currently amended) A method facilitating design and manufacturing processes, the method comprising
receiving a plurality of article characteristic values associated with a set of articles having a range of variation as to a plurality of article characteristics resulting from a process;
determining the regression model(s) between a first article characteristic and at least one remaining article characteristic in the plurality of article characteristics;
receiving a target value for the first article characteristic and a target value for said at least one of the remaining article characteristic; and
determining the intersection between the target value for the first article characteristic and a target value for said at least one remaining article characteristic.

35. (original) The method of claim 34 wherein regression models are determined for all possible combinations of article characteristics in the plurality of article characteristics.

36. (original) The method of claim 34 wherein regression models are determined for a subset of all possible combinations of article characteristics in the plurality of article characteristics.

37. (original) The method of claim 34, 35 or 36 further comprising
displaying the regression model(s) on a user interface display.

Appl. No.: 10/067,704
Amdt. Dated January 19, 2004
Response to Office Action of November 18, 2004

38. (original) The method of claim 37 wherein the regression model(s) are graphically displayed in scatter diagrams on the user interface display.

39. (original) The method of claim 34 further comprising
receiving the lower and upper specification limits for said at least one remaining article characteristics;
locating the specification limits associated with said at least one remaining article characteristic.

40. (original) The method of claim 39 further comprising
receiving the lower and upper specification limits for the first article characteristic;
locating the lower and upper specification limits for the first article characteristic.

41. (original) The method of claim 39 further comprising
(a) determining the value of the first article characteristic at which the regression model intersects the upper specification limit for said at least one remaining article characteristic.

42. (original) The method of claim 39 or 41 further comprising
determining the value of the first article characteristic at which the regression model intersects the lower specification limit for said at least one remaining article characteristic.

43. (original) The method of claim 41 further comprising
repeating the determining step (a) for a desired number of remaining article characteristics;
and
determining the most constraining maximum value for the first article characteristic by selecting the lowest value of the first article characteristic associated with the determining step (a).

44. (original) The method of claim 43 further comprising

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

(b) determining the value of the first article characteristic at which the regression model intersects the lower specification limit for said at least one remaining article characteristic;
repeating the determining step for a desired number of remaining article characteristics; and
determining the most constraining minimum value for the first article characteristic by selecting the greatest value of the first article characteristic associated with the determining step (b).

45. (original) The method of claim 44 further comprising

determining the target manufacturing value for the first characteristic by selecting the midpoint between the most constraining minimum and maximum values for the first article characteristic.

46. (original) The method of 44 further comprising

determining the maximum allowable range for the first article characteristic by subtracting the most constraining minimum value for the first article characteristic from the most constraining maximum value for the first article characteristic.

47. (original) The method of claim 44 further comprising

determining the target manufacturing value for the first characteristic by selecting a value between the most constraining minimum and maximum values for the first article characteristic.

48. (original) The method of claim 41 further comprising

receiving the lower and upper specification limits for the first article characteristic; and
locating the lower and upper specification limits associated with the first article characteristic;

repeating the determining step (a) for a desired number of remaining article characteristics;
and

determining the most constraining maximum value for the first article characteristic by selecting the lower of (1) the upper specification limit for the first article characteristic and (2) the

Appl. No.: 10/067,704
Amdt. Dated January 19, 2004
Response to Office Action of November 18, 2004

lowest value computed in the determining step (a).

49. (original) The method of claim 47 further comprising

(b) determining the value of the first article characteristic at which the regression model intersects the lower specification limit for said at least one remaining article characteristic;
repeating the determining step (b) for a desired number of remaining article characteristics;
and

determining the most constraining minimum value for the first article characteristic by selecting the greater of (1) the lower specification limit for the first article characteristic and (2) the greatest value of the first article characteristic computed in the determining step (b).

50. (currently amended) A method facilitating design and manufacturing processes, the method comprising

receiving a plurality of article characteristic values associated with a set of articles having a range of variation as to a plurality of article characteristics resulting from a process;

determining a first regression model between a first article characteristic and a second article characteristic;

determining at least a second regression model between the first article characteristic and at least one of the remaining article characteristics; and,

facilitating a comparison between the regression models.

51. (original) The method of claim 50 wherein regression models are determined for all possible combinations of article characteristics in the plurality of article characteristics.

52. (original) The method of claim 50 wherein regression models are determined for a subset of all possible combinations of article characteristics in the plurality of article characteristics.

53. (original) The method of claim 50, 51, or 52 further comprising
displaying the regression model(s) on a user interface display.

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

54. (original) The method of claim 53 wherein the regression models are graphically displayed in scatter diagrams on the user interface display.

55. (original) The method of claim 50 further comprising
receiving a target value as to at least two article characteristics;
as to a first article characteristic and a second article characteristic, locating the intersection of the target values of the first and second article characteristics relative to the regression model associated with the first and second article characteristics.

56. (original) The method of claim 55 further comprising
As to the first article characteristic and a third article characteristic, locating the intersection of the target values of the first and third article characteristics relative to the regression model associated with the first and third article characteristics.

57. (original) The method of claim 50 further comprising
receiving the lower and upper specification limits for the second article characteristic and a third article characteristic;
locating the specification limits associated with the second article characteristic relative to the regression model between the first article characteristic and the second article characteristic;
locating the specification limits associated with the third article characteristic relative to the regression model between the third article characteristic and the first article characteristic.

58. (original) The method of claim 56 further comprising
receiving the lower and upper specification limits for the first article characteristic;
locating the specification limits for the first article characteristic relative to the regression model between the first article characteristic and the second article characteristic; and
locating the specification limits for the first article characteristic relative to the regression model between the first article characteristic and the third article characteristic.

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

59. (currently amended) A method facilitating design and manufacturing processes associated with the production of an article, the article having a plurality of article characteristics, at least two of the article characteristics having a target value and upper and lower specification limits, the method comprising

generating a set of articles having a range of variation as to a plurality of article characteristics resulting from a process;

assessing the set of articles as to all or a subset of the plurality of article characteristics;

selecting a predictor characteristic from the plurality of article characteristics; and,

determining the regression model(s) between the predictor characteristic and at least one of the remaining article characteristics in the plurality of article characteristics.

60. (original) The method of claim 59 further comprising

determining the intersection of the target value for the predictor characteristic and the target value of at least one remaining article characteristic relative to the regression model between the predictor characteristic and said at least one remaining article characteristic.

61. (original) The method of claim 59 further comprising

determining the respective upper and lower prediction intervals associated with the regression model between the predictor characteristic and said at least one of the remaining article characteristics.

62. (original) The method of claim 60 further comprising

determining the respective upper and lower prediction intervals associated with the regression model(s) between the predictor characteristic and said at least one of the remaining article characteristics.

63. (original) The method of claim of 62 further comprising

locating the lower and upper specification limits associated with said at least one remaining

Appl. No.: 10/067,704
Amdt. Dated January 19, 2004
Response to Office Action of November 18, 2004

article characteristic;

locating the upper and lower specification limits associated with the predictor characteristic.

64. (original) The method of claim 59 further comprising

locating the specification limits associated with said at least one remaining article characteristic.

65. (original) The method of claim 64 further comprising

determining the value of the predictor characteristic at which the regression model intersects the upper specification limit for said at least one remaining article characteristic.

66. (original) The method of claim 64 or 65 further comprising

determining the value of the predictor characteristic at which the regression model intersects the lower specification limit for said at least one remaining article characteristic.

67. (original) The method of claim 61 further comprising

locating the specification limits associated with said at least one remaining article characteristic.

68. (original) The method of claim 67 further comprising

determining the value of the predictor characteristic at which the upper prediction interval associated with the regression model between the predictor characteristic and said at least one remaining article characteristic intersects the upper specification limit for said at least one remaining article characteristic.

69. (original) The method of claim 67 or 68 further comprising

determining the value of the predictor characteristic at which the lower prediction interval associated with the regression model between the predictor characteristic and said at least one

Appl. No.: 10/067,704
Amdt. Dated January 19, 2004
Response to Office Action of November 18, 2004

remaining article characteristic intersects the lower specification limit for said at least one remaining article characteristic.

70. (original) The method of claim 64 further comprising
 locating the upper and lower specification limits associated with the predictor characteristic.

71. (original) The method of claim 66 further comprising
 locating the upper and lower specification limits associated with the predictor characteristic.

72. (original) The method of claim 61 further comprising
 locating the lower and upper specification limits associated with said at least one remaining article characteristic.
 locating the upper specification limit associated with the predictor characteristic; and
 determining a maximum article characteristic value for the predictor characteristic by selecting the lesser of (1) the upper specification limit for the predictor characteristic and (2) the value of the predictor characteristic at which the upper prediction interval intersects the upper specification limit for said at least one remaining article characteristic.

73. (original) The method of claim 72 further comprising
 repeating the determining a maximum article characteristic value step for a desired number of remaining article characteristics in the plurality of article characteristics; and
 determining the most constraining maximum article characteristic value for the predictor characteristic by selecting the lowest maximum article characteristic value.

74. (original) The method of claim 72 further comprising
 locating the lower specification limit associated with the predictor characteristic; and
 determining a minimum article characteristic value for the predictor characteristic by

Appl. No.: 10/067,704
Amdt. Dated January 19, 2004
Response to Office Action of November 18, 2004

selecting the greater of (1) the lower specification limit for the predictor characteristic and (2) the value of the predictor characteristic at which the lower prediction interval intersects the lower specification limit for said at least one remaining article characteristic.

75. (original) The method of claim 74 further comprising
determining an allowable range for the predictor characteristic by subtracting the minimum article characteristic value from the maximum characteristic value.

76. (original) The method of claim 74 further comprising
repeating the determining a minimum article characteristic value step for a desired number of remaining article characteristics; and
determining the most constraining minimum article characteristic value for the predictor characteristic by selecting the greatest minimum article characteristic value.

77. (original) The method of claim 76 further comprising
determining the maximum allowable range for the predictor characteristic by subtracting the most constraining minimum article characteristic value from the most constraining maximum characteristic value.

78. (original) The method of claim 76 further comprising
determining the target manufacturing value for the predictor characteristic by selecting a value between the most constraining minimum and maximum values for the predictor characteristic.

79. (original) The method of claim 76 further comprising
determining the target manufacturing value for the predictor characteristic by selecting the midpoint value between the most constraining minimum and maximum values for the predictor characteristic.

Appl. No.: 10/067,704

Amdt. Dated January 19, 2004

Response to Office Action of November 18, 2004

80. (original) The method of claim 79 determining the intersection of the target value for the predictor characteristic and the target value of at least one remaining article characteristic relative to the regression model between the predictor characteristic and said at least one remaining article characteristic.

81. (original) The method of claim 59 wherein the selecting step comprises
selecting the predictor characteristic based at least in part on an assessment of the capabilities of each article characteristic to be predictive of the other article characteristics in the plurality of article characteristics.

82. (original) The method of claim 81 wherein the selecting step comprises
calculating the correlation coefficients between all or a subset of the article characteristics;
determining, based on the calculated correlation coefficients, a value indicating the predictive capability of a first article characteristic relative to all other article characteristics;
repeating the determining step for all article characteristics; and
selecting a predictor characteristic based at least in part on the values indicating the predictive capabilities of the article characteristics.

83. (original) The method of claim 82 wherein the predictor characteristic is selected as the article characteristic associated with the value indicating the highest predictive capability.

84. (original) The method of claim 82 further comprising
ranking the article characteristics based on the values computed in the determining step.

85. (original) The method of claim 82 wherein the determining step comprises
calculating the average correlation coefficient for each article characteristic.

86. (original) The method of claim 82 wherein the determining step comprises
calculating the average of the absolute values of the correlation coefficients for each article

Appl. No.: 10/067,704
Amdt. Dated January 19, 2004
Response to Office Action of November 18, 2004

characteristic.

87. (original) The method of claim 81 wherein the predictor characteristic is selected based on a graphical determination of the article characteristic having the greatest predictive capabilities.

88. (original) The method of claim 81 wherein the selection of the predictor characteristic is further based on factors associated with assessing each article characteristic.

89. (original) The method of claim 88 wherein the factors comprise the economic factors associated with assessing each article characteristic.

90. The method of claim 88 wherein the factors comprise the technical factors associated with assessing each article characteristic.

91. (currently amended) A method facilitating design and manufacturing processes, the method comprising

generating a set of articles having a range of variation as to a plurality of article characteristics resulting from a process;

assessing the degree of correlation between the article characteristics; and,

selecting a predictor characteristic from the plurality of article characteristics based on the assessing step.

92. (original) The method of claim 91 further comprising

determining a maximum allowable range for the predictor characteristic; and,

subsequent to the determining step, verifying that subsequently generated articles comply with at least one design specification associated with said articles based on assessment of the predictor characteristic.